

Orange Street Bridge
Spanning the Clark Fork River
at Orange Street
Missoula
Missoula County
Montana

HAER No. MT-99

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Rocky Mountain System Support Office
National Park Service
P.O. Box 25287
Denver, Colorado 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD
ORANGE STREET BRIDGE

I. INTRODUCTION

Location: Spanning the Clark Fork River at Orange Street in Missoula in Missoula County, Montana.

Quad: Southeast Missoula/Southwest Missoula

UTM: 12/271400/5195080

Date of Construction: 1936 -1937

Present Owner: Montana Department of Transportation
2701 Prospect Avenue
Helena, Montana

Present Use: Highway Bridge

Significance: The Orange Street Bridge is one of only fourteen steel deck truss bridges designed and constructed by the Montana Department of Transportation between 1920 and 1952. It comprised a standard design developed by the department after 1932. There were only 15 bridges displaying this aesthetically distinctive design in Montana. The Orange Street Bridge's history as a 1930s New Deal "make work" project is also well documented and included a labor strike by the local unions to protest the low wages stipulated by the federal government's Emergency Relief Act of 1935. The Orange Street Bridge is also the only remaining structure in Montana constructed by the Portland Bridge Company of Portland, Oregon.

Historian: Jon Axline, Montana Department of Transportation, February, 1999

II. HISTORY

The first recorded Euro-American incursion into the Missoula Valley occurred in September, 1805, when several hunters from the Lewis and Clark Expedition entered the valley from the group's camp (Traveller's Rest) at the mouth of Lolo Creek, nine miles south of the existing Milwaukee Road Overpass. During the expedition's return east the following year, it again camped at the mouth of Lolo Creek in early July, 1806. After four-day layover at Traveller's Rest, Lewis and his co-captain, William Clark, split the Corps of Discovery into three units, each detailed to explore as much territory as possible between the Bitterroot Valley and the confluence of the Missouri and Yellowstone Rivers, about 565 miles to the east. On July 3, 1806, nine expedition members and five Salish Indians under Meriwether Lewis's command descended the Bitterroot River to its junction with the Clark Fork River at present-day Missoula. Lewis reported that

[H]ere the [I]ndians recommended our passing the river which was rapid and 150 yds wide. [Two] miles above this place I passed the entrance of the East branch of Clark's River which discharges itself by two channels; the water of this river is more turbid [sic] than the main stream and is from 90 to 120 yds wide. [As] we had no other means of passing the river we busied ourselves collecting dry timber for the purpose of constructing rafts

Heavy Spring run-off on the Clark Fork swept Lewis and two men several hundred yards downstream to the vicinity of the existing Orange Street Bridge, where they were able to use partially submerged willows to pull themselves from the river. After camping overnight at the mouth of Hellgate Canyon at the east entrance to the Missoula Valley, the party left the valley and ascended the Blackfoot River to the Missouri. Lewis's detachment rejoined the expedition on the Missouri River near the mouth of Yellowstone River on August 12, 1806.¹

When the Lewis and Clark Expedition crossed the continental divide in August, 1805, it entered territory that had been claimed by Great Britain since the late 18th century. Once news of the expedition's discoveries reached Canada, British and French-Canadian fur trappers and traders invaded what was called "Oregon Territory." Indeed, for over eight decades, Canadians dominated the fur trade west of the continental divide in Montana. Between 1807 and 1821, western Montana was extensively explored and exploited by traders from the Canadian North West Fur Company. Like its rival the Hudson Bay Company (HBC) further to the east, the "Nor'westers" were aggressive explorers and traders, relying almost exclusively on the region's aboriginal inhabitants to trade furs and pelts at the company's posts. By 1811, the North West Company had established trading posts on the Clark Fork River near Thompson Falls, on the Kootenai River near Libby and adjacent to Flathead Lake near Kalispell. Called Saleesh or Salish House, the Clark Fork River outpost provided the base from which company Factor David Thompson explored much of northwest Montana. In late February, 1812, Thompson mapped the confluence of the Bitterroot and Clark Fork rivers in the Missoula Valley from a vantage place on Mount Jumbo. The Nor'westers dominated the fur trade in the valley and Pacific Northwest until it forcibly merged with the HBC by the British government in 1821. The HBC then assumed the North West company's formal role and conducted a lively trade with the Salish, Kootenai and Pend d'Orielle Indians from its trading post, Fort Connah, located about sixty miles north of the Missoula Valley.²

The west side of the continental divide in Montana was a British possession until the Convention of 1818 designated the area between the 49th parallel in the north and Spanish possessions in the south as a territory of joint occupation with the Americans. Consequently, the Bitterroot and Missoula valleys were frequented primarily by trappers working for either the HBC or one of the American fur companies. In June, 1846, the British relinquished its claims to the area south of the 49th parallel and "Oregon Territory" became the property of the United States. The HBC, however, was reluctant to relinquish its lucrative trade network in northwest Montana. It was not until 1871 that Canadian company closed its last remaining outpost in the United States - Fort Connah.³

In September, 1841, Jesuit Father Pierre Jean DeSmet established St. Mary's Mission near the Bitterroot River at present day Stevensville. Generally credited with cultivating the first wheat and importing the first cattle into Montana, the mission was active in the valley until 1850 when increasing depredations by the Blackfeet forced its closure. A former fur trader, John Owen, purchased the complex in 1850 for \$300 and expanded it into the preeminent trading post in western Montana. Fort Owen was the first permanent American settlement in the vicinity of Missoula and continued to function until 1872, when Owens' deteriorating health and declining revenues from his fur and agricultural interests forced him to close the trading post. By then, however, both the lower Bitterroot and Missoula valleys were well known to American traders, miners and settlers. In 1853, surveyors under the command of Washington governor Isaac Stevens made the first of a series of surveys through northwestern Montana in search of a route for a transcontinental railroad. The Stevens Expeditions laid the groundwork for the establishment of the Missoula valley as an important transportation center for northwestern Montana. Importantly, Stevens's aide, Lieutenant John Mullan extensively explored and mapped the Bitterroot and Clark Fork drainages in western Montana.⁴

Both Stevens and Mullan noted that although the Missoula area was the aboriginal territory of the Salish Indians, the region was also frequented by Kootenai, Blackfeet and Pend d'Orielle Indians. Realizing the strategic importance of the valley, Stevens induced the Salish, Kootenai and Pend d'Orielle Indians to sign the Hellgate Treaty at Council Grove about seven miles west of Missoula in July, 1855. The treaty established the Flathead Reservation in the Mission and Jocko river valleys to the north, provided an annuity to the tribes and gave the U.S. government the right to construct railroads and roads across tribal territory. The treaty also effectively opened up the Bitterroot and Missoula valleys to non-Indian settlement. By late 1860, Mullan had completed a 624-mile military wagon road through the Missoula valley that connected Fort Walla Walla in Washington Territory with Fort Benton, the head of navigation on the Missouri River.⁵

In 1863, Mullan presented his report to Congress. Two years later, in 1865, he republished parts of it as a traveler's guide for those wishing to cross or settle in the new territory. He described the Missoula valley as already the site of ten or fifteen farms in the Frenchtown area, with plenty of room for more. Further, he reported

The small creeks in the [valley] offer many choice sites for farms; a dozen at least are here now under cultivation. Wheat, potatoes, oats and barley, and all vegetables are raised.

According to Mullan, the traveler should reach the Missoula valley by the 28th day out from Fort Walla Walla in Washington Territory. By late 1860, a trading post had been

established adjacent to the Mullan Road by Frank Worden and Captain C. P. Higgins. By 1863, it included a store, blacksmith shop and several cabins. The traveler, Mullan asserted, should consider resting his animals at the trading post where "supplies of all kinds can be obtained . . . if needed."⁶

The Mullan Road provided the impetus for the settlement of the Missoula valley as it facilitated access to it from the west and the east. By May, 1864, the Hell Gate settlement included 72 people, a store, cabins, barn, saloon, blacksmith shop and assorted outbuildings. The community reported by Mullan in 1863 was located about four miles east of the existing Orange Street Bridge at the entry to Hell Gate Canyon. By late 1864, three members of the community had established the Missoula Valley Mill, a sawmill that provided lumber to settlers in the Missoula, Bitterroot and upper Clark Fork River valley. Within a few years, several other sawmills had been established in the valley, making the Hell Gate area significant for its sawmills rather than for its agriculture as was reported by Mullan in 1863. The lumber boom in the valley expanded after gold was discovered at Grasshopper Creek (1862), Alder Gulch (1863), Last Chance Gulch (1864) and Cedar Creek (1870). Although federal support of the Mullan Road disappeared in 1863 because of the demands of the Civil War, the route was kept open by individual entrepreneurs who "adopted" segments of it and maintained them as toll facilities. The valley's strategic location on the road stabilized the economy and contributed to a steady population growth at Missoula in the late 1860s. When the Cedar Creek gold mines played out in 1873, many of the people living in the mining camps there re-settled in the Missoula Valley. Although the valley was part of Idaho Territory beginning in 1863, the creation of Montana Territory in May, 1864 placed it within the boundaries of the new territory. Hell Gate functioned as the Missoula County seat until 1866, when it was removed to the new community of Missoula.⁷

Missoula thrived between 1866 and 1883 when the Northern Pacific Railroad arrived. The community remained an important transportation center with five roads passing through the town. The sawmills, however, continued to dominate the area's economy even after Fort Missoula was established by the U.S. Army about three miles west of town. The post was located in the valley ostensibly to protect settlers in the Missoula and Bitterroot valleys from any possible Indian raids from the Flathead Reservation to the north. In June, 1883, the Northern Pacific Railroad reached Missoula. The railroad provided access to markets both within Montana and out-of-state for the farmers, ranchers and lumbermen. Northern Pacific executives designated the city a division point for the railroad and constructed extensive switching yards and repair shops just to the north of the Orange Street Bridge. The presence of the transcontinental railroad caused the Missoula economy to boom. In 1885, the city was formally incorporated; three years later, in 1888, W.J. Stephens and W.M. Bickford platted the first large addition to the city - South Missoula. Although Stephens and Bickford had grandiose plans for the new addition (which they planned as a self-contained community), Judge Hiram Knowles thwarted them by platting the First Knowles Addition in 1889. This addition cut the South Missoula Addition off from the Clark Fork River. The south approach of the adjacent Milwaukee Road Overpass (HAER No. MT-100) was located in the Sunnyside Addition.⁸

By 1890, the population of Missoula had reached 3,425 people. The 1890 Sanborn Fire Insurance Map for Missoula indicates that the area north of the Clark Fork River near the Orange Street Bridge was occupied by several wood frame boarding houses. The map also suggests that the area may have been the site of the Missoula Red Light District. By 1908, when the Milwaukee Road Railroad arrived at Missoula, the area was dominated by commercial enterprises, suggesting that the area had become dependent on the transportation

opportunities afforded by the nearby Northern Pacific and Milwaukee Road railroads. The city's growth was also augmented by the establishment of the University of Montana at Missoula in 1895 and by the location of the United States Forest Service's Region One headquarters in Missoula in 1908. Growth in the vicinity of the future site of the Orange Street Bridge also remained steady during the period. A substantial residential district had grown up on the south side of the river in the Sunnyside Addition. While most of the commercial development occurred north of the Clark Fork River, a substantial lumber yard (Polleys Lumber Yard) opened its doors near the site of the Orange Street Bridge in 1910. The area was also traversed by the Orchard Homes Ditch (24MO545), an irrigation system constructed in 1907 to provide water for small fruit orchards in the Orchard Homes Subdivision about two miles to the southwest. Evidence also suggests that the low-lying marshy area adjacent to the Clark Fork River near the bridge was utilized as a city dump by 1917.⁹

Missoula's strategic location at the confluence of five major western Montana valleys assured a stable economy and steady growth even during the lean years of the Great Depression. The city was also at the crossroads of three interstate highways: U.S. Highways 10, 12 and 93 and Montana Highway 200. By 1935, the population of Missoula included around 18,000 people. To alleviate the traffic congestion in the heart of the city, the Missoula city planners and others began lobbying for a by-pass around the business district that would provide a more direct connection between U.S. Highway 93 from the Bitterroot and Jocko valleys and U.S. Highway 10. The proposed Missoula Bypass, however, would eventually include three bridges: the Milwaukee Road Overpass (HAER No. MT-100), the Orange Street Bridge, and the Orange Street Underpass (24MO365). Key to the developers' and promoters' plans was the involvement of the Montana State Highway Commission (SHC).¹⁰

On November 1, 1935, a delegation of Missoula businessmen, led by the mayor and city commissioners, appeared before the SHC to support the Harris and Orange street alternate for the proposed Missoula By-pass project. Although no funds were as yet available for the bypass project, the SHC voted unanimously to accept the Missoula delegation's recommendations. Despite the lack of funding, the SHC programmed the Missoula Bypass Project that same day. The passage of the Emergency Relief Act by Congress in July, 1935 provided the funds needed to construct the Missoula Bypass. Consequently, on April 25, 1936, advertisements appeared in the *Daily Missoulian*, *Western Engineering News* and other publications requesting bids for the construction of a bridge across the Clark Fork River in Missoula. Designated U.S. Works Program Highway Project No. WPMS 374-B, the project also included the construction of 0.127 miles of approach roadway. According to the contract, workers on the project had to be hired from the Missoula office of the United States Employment Service at wages established by the agency.¹¹

Because the area in the immediate vicinity of the project area had been developed as a residential area since about 1890, the SHC had considerable difficulty securing the right-of-way necessary for the construction of the adjacent railroad overpass and the Orange Street Bridge. The problems were also compounded by the presence of the Orchard Homes Ditch, substantial residences in the Sunnyside Addition and the proximity of the city dump in the flood plain on the east side of the project area. Indeed, one homeowner living near the Milwaukee Road Railroad tracks adjacent to the Polley Lumber Company complex complained that the proposed overpass and the fill between the two structures would block his view of the Clark Fork River (and, incidentally, the dump).¹²

By the end of March, 1936, most of the right-of-way for the project had been secured by the State Highway Commission. Despite the initial hostility of the surrounding landowners, no property was condemned by the Commission for the project. Notwithstanding the SHC's concessions to the landowners in the immediate vicinity of the adjacent Milwaukee Road Overpass project (which began construction on April 15), a sufficient number of property owners in the area were still unhappy enough to complain to Missoula's mayor and city commission. Consequently, the city failed to pass resolutions to close parts of Orange, Cottonwood and Chestnut streets by early April, 1936. Because of the city's reluctance to curry poor favor with the area residents, it did not approve a resolution to close three of the streets in the vicinity of the project. The SHC's only victory was restricting the kind of garbage dumped in the adjacent landfill,

In reference to the request of the Bureau of Public Roads that we obtain a resolution from the City Council eliminating the dumping of refuse to a distance not closer than 200 feet from our project: I have discussed the matter with the City Engineer, and we went down on the ground and looked it over. All of this stretch of ground between the river and Front Street has been designated as a garbage dumping ground. However, the city has a very definite plan for the improvement and beautification of this stretch of [the] river as soon as the fill has been made by the dumping of refuse. The City Engineer advised that they would refrain from dumping any wet garbage with a distance of 200 feet, but that they would like to complete the dump as had been planned [I]f they do not dump any refuse west of our present line, there would be a hole left in there which would be very unsightly.

Though not clear in the historical record, the SHC had, apparently, resolved all of the issues regarding the overpass and the right-of-way by the second week of April, two weeks before the scheduled letting of the project.¹³

On May 8th, the Commission awarded the contract for the construction of the Clark Fork River bridge to the Portland Bridge Company (PBC) of Portland, Oregon for \$154,514.90. The company was one of five bidders on the project. The Commission directed that the project had to be completed by June 15, 1937. Prior to this contract, the PBC had built only three bridges in Montana, all were steel truss structures in north central Montana. At the time the SHC awarded the Orange Street Bridge contract to the PBC, it was just completing work on a bridge over the Milk River near Havre.¹⁴

Because of scheduling problems with the Milk River Bridge project, the PBC began did not begin work at the Orange Street bridge site on the Clark Fork River until June 4, 1936. Initially, the work included clearing and some earth work. By June 20th, however, high water in the river, and the lack of equipment forced the company to suspend construction operations at the site. Portland Bridge Company foreman, R. E. "Dick" Meith, told the *Daily Missoulian* that the firm could begin not work on the bridge's foundations until several railcars of construction equipment arrived from its project near Havre in north central Montana. It is not known if the equipment arrived at the construction site by the date Meith specified. On August 4, 1936, however, Chief Highway Engineer Don McKinnon reminded Meith that work on Bents No. 1 and 2 of the river bridge had to be completed by early September so that the fill work between it and the Milwaukee Road Overpass could be completed by the Thomas Staunton company. McKinnon added that, "Your contract was awarded May 8, 1936, and it is our opinion that the three months period which has elapsed since the awarding of the contract would have provided ample time for

you to have completed bents Nos. 1 and 2." Most of the pressure was coming from Staunton's foreman, Evarts Blakeslee.¹⁵

Under pressure to complete the overpass project by the deadline set by the SHC, Blakeslee confronted Meith several times about the issue. On August 5, 1936, Blakeslee was severely injured in a fall from the framework for one of the bents in question. Recognizing the adversarial relationship between Blakeslee and Meith, the SHC frequently asked the men to cooperate and work out some plan that would cause the least amount of interference on both projects. The SHC wanted no part of the feud between the men. Blakeslee, however, seemed unable to work with Meith. From his hospital bed, he wrote McKinnon,

Referring to the letter of the Portland Bridge Company, dated August 8th last, addressed to Mr. D. A. McKinnon . . . , the writer is pleased to have been favored with a copy of this expostulation of alleged facts for particularly educational purposes, it being a post graduate thesis on (Stalling for Time) . . .

Unfortunately, the letter Meith wrote to McKinnon on August 8th has not survived.¹⁶

It was not until August 20th that the PBC began construction on Bent No. 1 of the Orange Street Bridge. Again, the SHC was unhappy about the progress of the work on the bridge's substructure. Missoula Division Engineer Harold Tilzey chastised Dick Meith for not beginning work on the bent until 10 o'clock in the morning and for not making arrangements for an extra work shift. In addition, Tilzey believed Meith was poorly organized and that the PBC needed a carpenter foreman on the job to oversee the construction of the forms for the concrete bents. Finally, the Division Engineer instructed Meith's foreman, F. W. Warbrick, to arrange for two shifts because he could not possibly pour the concrete in one eight-hour period. He concluded with a stern warning, "Another shift will be procured in the morning, and the footing will be completed tomorrow."¹⁷

The Portland Bridge Company did not complete work on Bents Nos. 1 and 2 until late September, 1936, several weeks after the deadline set for it by Chief Highway Engineer McKinnon in early August. The PBC had, however, already begun construction on Piers Nos. 1 and 3 and Bent No. 6 by the time the first two bents were completed. Fortunately for the Portland-based company, SHC core drillers discovered that the river bed at the bridge site was composed of tightly compacted gravel, which resulted in the SHC dispensing with its original design to include fourteen pilings to support the bridge piers. Like the contractor on the Milwaukee Road Overpass project a few hundred yards to the south, the PBC eventually became embroiled in labor difficulties that put the company further behind schedule.¹⁸

Because Montana lacked the wherewithal to provide matching funds for the construction of the bridge, the federal government assumed full fiscal responsibility for it under the New Deal's 1936 Emergency Relief Program. Consequently, the federal Bureau of Public Roads was ultimately responsible for the construction of the Orange Street Bridge project; the SHC was merely the middle-man in the project, responsible for the design and for compliance with the federal regulations under which the bridge was constructed. Like many of the New Deal programs of the 1930s, the Emergency Relief Act was designed by the U.S. government to put as many people to work as possible. In order to do this, it imposed strict regulations on how labor was hired and how much could be paid them to obtain the maximum use of limited federal dollars. Consequently, the wages on road and bridge projects funded by the federal government

were sometimes significantly lower than what the local labor unions demanded. In Missoula, the Missoula Trades and Labor Council (MTLC) was an active champion of the city's workers. Wages paid by the federal government were significantly lower than what the MTLC had obtained for its members prior to 1930. The SHC was frequently petitioned by attorneys for the MTLC to make the wages equal to the already existing union scale wages. The SHC, however, largely paid lip service to the MTLC because continued federal highway funding was dependent on the Commission's strict adherence to the regulations. A conservative group, the Commission initially made no moves to correct the perceived inequities in the system.¹⁸

Consequently, on September 26, 1936, the MTLC struck the Portland Bridge Company's Orange Street Bridge project for the same reasons it had picketed the Milwaukee Road Overpass construction site two weeks earlier. The MTLC demanded that only union members be employed on the project and that they be paid the established union wages. The Missoula Trades and Labor Council also demanded that the PBC then enact a five-day work week rather than the existing seven day work week unless the company was willing to pay double time to its employees. The Council, moreover, also demanded that the National Reemployment Service office in Missoula only supply union members who were on relief to the PBC for the bridge project. Rather than comply with the MTLC's demands, the Portland Bridge Company's president, Dick Meith, chose to shut down the work site. Meith refused to hire scabs to continue work on the project, unlike Thomas Staunton on the adjacent Milwaukee Road Overpass project. Consequently, where Staunton's actions invited a violent response from the Teamster's union, the PBC just continued to fall further behind schedule. By October 10th, the PBC acceded to the union's demands. Although the SHC proposed filing a lawsuit against the federal government to clarify the sometimes conflicting regulations, there is no record of the outcome in any of the SHC documents.²⁰

The structural steel for the bridge's superstructure began arriving in Missoula the second week of December, 1936. The 420 tons of structural steel and seven tons of cast steel was supplied to the PBC by the Minneapolis Steel and Machinery Company, a subsidiary of the Minneapolis-Moline Power Implement Company. The PBC, however, had yet to finish the bridge's substructure by the time the structural steel began arriving at the construction site. The Portland Bridge Company reported to the *Daily Missoulian*, that all steel workers would be members of the MTLC as specified in the union contract approved in October. It was not until the second week of January, 1937 that the final shipment of structural steel arrived in Missoula from Minnesota.²¹

Because of the PBC's slowness in the Orange Street Bridge construction of the structure's piers, company president Dick Meith determined that two spans would have to be built simultaneously so that the trusses were completed by the spring. The steel crews worked rapidly despite ten days of sub-zero weather, completing the supporting falsework and the erection of the trusses by the end of February, 1937. At that point, the riveters began connecting the various components of the bridge. Meith estimated that 20,000 rivets would be utilized on the structure by the time the work was completed in early April.²²

Despite the rapid progress on the bridge's superstructure, the Portland company continued to have problems with the substructure. By March 1st, the SHC's Division Engineer, Harold Tilzey, notified the Project Engineer, Richard Slattery that because the footings of Bents nos. 7 and 8 were located within the city dump, the excavated fill material was unsuitable for use as backfill. Slattery, therefore, was forced to go elsewhere to look for the required 465 cubic yards of fill material. Early in March, 1937, the *Daily Missoulian* reported that the trusses were in-place and

that the riveters were about 40 percent completed. Both the SHC and Portland Bridge Company engineers were optimistic that the bridge would be completed by the June 15th deadline, if the weather remained good. Apparently, however, the weather did not hold and the pouring of the concrete decks was postponed until May as was the painting of the bridge with aluminum paint to cover the "garish red of the steel." Concrete steps off the north and south ends of the bridge's sidewalks also had yet to be poured by the end of March, 1937.²³

By the first week in May, 1937, the steel riveters had completed their work on the bridge and PBC workers began construction of the wooden forms for the concrete deck of the structure.

Carpenters are working this week building the lumber forms on which the concrete will be poured. Swinging their hammers on the lumber stretched across the steel girders they have as insecure and breezy work as the steel gangs, the riveters and erectors who flung the skeleton across the river.

The *Daily Missoulian* stated that the PBC expected to utilize 400 yards of concrete for the five concrete slabs that comprised the deck and sidewalks of the structure. It was becoming evident in the newspaper, however, that Missoulians were becoming impatient with the slowness of the work with many not understanding that the concrete had to cure before the State Highway Commission would allow traffic on the bridge. It was also obvious that the Commission was not satisfied with the PBC's progress on the bridge when Bridge Construction Engineer Russell Stephenson complained to Dick Meith that he was not going to meet the project deadline.²⁴

By May 26th, however, the PBC had poured more than half the concrete needed for the bridge's deck. In response to Stephenson's May 20th letter, Meith replied that the reason the Orange Street Bridge project was behind schedule was because of unforeseen labor problems concerning the mandated wage rates on federally-funded projects. He also complained that the Missoula Trades and Labor Council permitted his crews to work only five days a week, unless they were willing to pay overtime - which they were not. There were also frequent work stoppages, Meith said, because the Missoula National Reemployment Service office was not sending them qualified workers,

On May 13, 1937, we requested 2 concrete finishers. On May 15th we received one. On May 13th, we requested 11 laborers and on May 14th we received seven. . . . At the time we were pouring the concrete deck for Span #3 the National Reemployment Service office would furnish union men unless they were on relief and furthermore, would not furnish men who were on relief that did not belong to the union. This resulted in the necessity of stopping our concrete work while pouring Span #3 to a later date.

The strike at the construction site in September and October, 1936 added to the delay in completing the project on time.²⁵

On June 18th, Dick Meith announced that the Orange Street Bridge was 98% complete with only the fill work and the painting of the bridge an aluminum color left to be finished by the company. When it became obvious to Meith that the SHC and the Bureau of Public Roads were going to invoke the liquidated damage clause to the contract because the June 15th deadline was missed by the PBC, he began requesting information from the company's Portland office on the amount of material used on the project. Portland Bridge Company bookkeeper B. Weinstein wrote that the Colorado Builders Supply Company of Pueblo had shipped 84 tons of reinforcing steel to

Missoula on the railroad. In addition to that, the PBC purchased 3,102 pounds of reinforcing steel from the Missoula Mercantile Company in April and May, 1937, presumably for the construction of the concrete deck slabs.²⁶

Less than a week before the PBC completed construction of the bridge, the City of Missoula opened a new city dump about two miles west of the Orange Street Bridge, the site of the original city dump. The *Daily Missoulian* reported that the city's "down-town district will no longer be marred by the unsightly picture of a city dump nestled close to its new Orange Street Bridge." Four days later, on June 29th, acting Missoula Division Engineer, Guy Johnson told SHC chairman and Missoula businessman, Lloyd Hague that the bridge would not be opened until after he had arranged for a formal opening of the structure. On July 1, 1927, the Commission and Bureau of Public Roads engineers accepted the bridge from the Portland Bridge Company and issued a Certification of Completion. The following day, after "consultation with Mr. Luke Martin of the Bureau of Public Roads, Hague authorized the opening of the bridge to traffic on July 3rd. That day, according to one witness, the Missoula Chief of Police counted "212 cars, one horse and buggy, and 87 bicycles" utilizing the bridge in a fifteen minute period during the noon hour. Today, the bridge carries 20,600 vehicles a day over the Clark Fork River on Orange Street.²⁷

As completion of the project neared, Missoula mayor, Dwight Mason, placed the Missoula Active Club in charge of organizing the dedication ceremonies for the Orange Street Bridge. A civic organization similar to the Kiwanis and Rotary Club, the Missoula Active Club promoted the economy and welfare of the Garden City. On July 9th, the club's Bridge Dedication Committee chairman Edward Dussault, an attorney, announced that it was sponsoring a name-the-bridge contest with the winner receiving \$25. Stressing originality, the contest rules stated that the bridge's name must incorporate the names of the streets that intersected near where the structure crossed the river. Contest judges included the city council members and three unidentified members of the public. By July 12th, the Active Club had received over 200 entries with more expected before the contest closed at midnight on that date.²⁸

The opening of the bridge, however, was marred by two significant problems. On July 7th, nine days before the dedication ceremonies, the *Daily Missoulian* editor complained that although oiled walkways had been provided for pedestrians on the fill between the Milwaukee Road Overpass (HAER No. MT-100) and the Orange Street Bridge, there was nothing to keep them from falling off the fill into the old city dump below. "While the drop is not abrupt," the editor stated, "it seems doubtful that if one stepped over the edge of the walk he could not save himself from falling the entire distance to the river level." Declining to take any of the blame for this oversight, SHC chairman Lloyd Hague responded that the blunder was not his fault as the bridge's design was completed before the governor appointed him to the highway commission. In an obvious nonsequitor, the chairman announced that the bridge "complete as stands" and that it had been "erected along the lines of modern architecture and bridge construction."²⁹

More importantly, the bridge's lighting system failed after it had been turned on by the city on July 3rd. Although the PBC, Walford Electric Company electricians and the Montana Power Company had tested the electrical system on July 1st, and the lights had illuminated the bridge for two successive nights, sometime in the evening of July 5th, the electrical system overtaxed the power lines and the wires "melted." Initially, no one knew what caused of the problem or who was to blame for the malfunction. Both the City and the County blamed the Montana Power Company, who, in turn, blamed Walford Electric for faulty installation of the wiring. The PBC

blamed the SHC for the failure since it had selected the design of the lighting system; the Commission blamed the power company. The City of Missoula claimed that the lighting system was part of the bridge, which had not yet been turned over it by the contractor or the commission.³⁰

The highway commission's chief bridge design engineer, Ben Omburn explained to Commission chairman Hague that he was not all that crazy about the lights being on the bridge in the first place, but that he had been coerced into cooperating with the City by a former Commission member. Further, he stated, "It has not been the policy of the State Highway Commission to install or maintain light standards on our highway bridges." He did admit, though, that the lights looked pretty good on both the Orange Street Bridge and the Milwaukee Road Overpass. Omburn concluded to Hague that it was the City of Missoula's responsibility to determine the cause of the failure and then correct it. The *Daily Missoulian* lamented that the "bridge will be dark tonight and for several more nights before the damage is repaired, from the present outlook." In fact, two weeks after the bridge was dedicated, the lights were still not working,

Missoula's new bridge continues to be bathed in darkness. As the brilliant July sun sinks in the West, the new bridge, pride of the city's newer structures, is outlined in jet and white as auto headlights throw rails and well-glassed lamps into relief. . . . Everybody is blaming everyone else. So now an expert from an electric company is coming here soon to find out just what is what. He is expected to tell where the fault lies. Until then it looks as if the Parkway bridge will remain the Darkway bridge.

It was not until October, 1937 that the city corrected the problem and the lights on the bridge turned on.³¹

Despite the problems with the pedestrian guardrails and the lighting system, bridge's dedication ceremony on July 16th was a resounding success. At 5 p.m., the participants in the festivities gathered at Northern Pacific Railroad Depot on Higgins Avenue and marched south five blocks to the Higgins Avenue Bridge. From there, the procession turned west on Front Street, where it proceeded three blocks to the new bridge. After a number of short speeches by SHC chairman, Lloyd Hague, Judge Ralph Arnold and "various officials", who were mostly employed by the SHC, Missoula Active Club member Bill Frisbee announced Edna Tingley the winner of the name-the bridge contest and presented her with a \$25 check. Ms. Tingley cut the ribbon stretched across the deck of the bridge while the Missoula city band played the National Anthem.

With the ribbon-cutting and the breaking of a bottle of wine on the bridge's concrete endpost, it was officially christened the "Parkway Bridge." It would seem that none of the 265 entries included an appealing name for the structure based on the contest rules. The ceremony, which was timed to coincide with the annual convention of the Montana Municipal League in Missoula. Immediately after the ribbon fell to the pavement, "a line of cars carrying officials . . . began the trip over the bridge. Heading the procession were two highway patrol motorcycle officers."³²

Like the nearby Milwaukee Road Railroad Overpass project, the contractor completed the project after the deadline stipulated in the contract. As with the other structure, the construction site was picketed by members of the Missoula County Trades and Labor Council protesting the wages established by the National Re-employment Act regulations. Unlike the nine-day strike at the overpass, however, the strike at this construction site lasted two weeks. After the conclusion of the strike, the PBC rushed to complete the project on time by putting the workers by increasing the work day, contrary to federal regulations. Despite its best efforts, the PBC was fifteen days late when the SHC certified the project completed on July 1, 1937. Based on the extenuating

circumstances, the SHC waived the liquidated damages clause of the contract at its July 30, 1937 meeting.³³

In late September, 1937, the Island Park Committee of Missoula petitioned the Montana State Highway Commission to transfer a 10 acre parcel adjacent to the Milwaukee Road Overpass to the City of Missoula for use as a city park. Because the land was no longer needed by the SHC, the Commissioners transferred the land to the city. Today, a portion of the property still functions as a city park. In 1962, the City petitioned the Commission to allow it to utilize a portion of the deeded property as a city storage yard and construct a garage upon it. To mitigate the impacts to the adjacent city park, the City proposed to landscape around the storage yard to hide it from view. The Commission approved the city's proposal.³⁴

III. THE BRIDGE

A. DESCRIPTION

The Orange Street Bridge is a seven-span steel Warren deck truss structure with two reinforced concrete T-beam approach spans and two steel stringer spans. The structure rests on four reinforced concrete bents and four reinforced concrete piers. The bridge consists of two 13'6" approach spans, a 39'9" steel stringer span (no. 2), a 40'3" steel stringer span (no. 6) and three 130-foot steel Warren truss spans. There are 10 panels to each span. The structure is supported on the ends by reinforced concrete abutments. The bridge has an overall length of 503'2" long with an out-to-out width of 41-feet. The deck includes a 30-foot driving surface flanked by two 5-foot wide concrete sidewalks. The steel truss spans provide a vertical clearance of 20-feet from the bottom chords to the Clark Fork River. The structure has a maximum span length of 130-feet.

Substructure

The bridge's substructure consists of four reinforced concrete bents and four reinforced concrete piers. The bents and piers are numbered consecutively from south to north.

Bent No. 1 consists of an open hammerhead-type reinforced concrete structure. It is 37'6" in height. There are two columns comprising the bent; both are 4' x 2' at the base and taper to 2' x 2' at the top. The bridge's deck overhangs the bent by 12'6". The footing consists of two 10' x 4'2" concrete blocks. The bent foundation is a 24' long by 4' deep concrete base. The "door" between the bent columns is broken by a 4'0" x 11'9 1/4" concrete diaphragm. The door is 11'8 1/4" wide and 17'4" deep to the base of the diaphragm.

The dimensions for Bent Nos. 2, 7 and 8 are virtually identical except in height. Bent No. 2 is 43'9" in height, while Bent No. 7 is 38' in height and Bent No. 8 is 37'9" in height. The dimensions of the columns, diaphragms and foundations are the same as Bent No. 1.

Pier No. 3 consists of a reinforced concrete structure. It is 9' across and the top of the foundation and tapers to 3'8" at the top. The pier is 25'2" tall from the foundation to the top (approximately 20' is exposed). The pier is recessed 2'3" from the foundation. The structure is 33-feet wide and 3-feet across at the neck. The foundation is 5-feet deep.

Piers Nos. 4 and 5 are virtually the same dimensions except in height. The reinforced concrete foundations are squared and are 43-feet in length, 10-feet deep and 4-feet wide. That portion of the pier that is exposed above the low water level is rounded on the downstream side (east) and

pointed on the upstream side. This section of the pier is 32'0½" in length, 22'6" deep. Pier No. 4 is 32'6", while Pier No. 5 is 30'6". The top of the pier is 4-feet wide except at the tops, where there are 5' x 2' concrete caps. The "nose" of the piers are angled to the tops from the upstream side (west). From the profile, the piers angle from 36'8" at the base to 30-feet at the top.

Pier No. 6 is a reinforced concrete structure that is 9-feet wide at the base and tapers to 3'8" across at the top. The structure is 19'9" in height from the base of the foundation to the concrete cap; 14'9" is exposed above the low water level. The pier column is recessed 2'5" from the squared foundation (the foundation is the same dimensions as on Pier No. 4). The pier is 33-feet in length.

Superstructure

Spans Nos. 1 and 7 are composed of reinforced concrete T-beam structures. Each span consists of six concrete beams woven into the deck. The beams are 4'8" deep and 3' wide and are spaced 3-feet apart. The spans are enclosed by concrete sidewalls and backwalls and filled with rubble. The sidewalls are roughly triangular in shape with the outsides 8'3" in height and the insides (toward the river) 18'3" in height. The sidewalls are all 22-feet in length. The sidewalls are flanked by raised pilasters. The pilasters are 3' x 4'. There are three sets of bush hammered grooves of varying length on each pilaster. The grooves are spaced 1-foot apart, are 3" wide and ¼" deep. For columns 1 and 4, they are 5'6", 6' and 6'6" in length. For columns 2 and 3, they are 15'9", 16'8", and 17'7" in length. There are also two bush hammered grooves on the north and south-facing ends of the pilasters. The grooves are 4-feet in height and 2½" wide. The sidewalls between the pilasters are decorated with three sets of inverted squared horseshoe-shaped bush hammered grooves on the fascia. The grooves are "horseshoes" are two-feet across and spaced 2-feet apart. They are 3" wide and ¼" deep.

Flanking the deck of the approach spans (nos. 1 and & 7), there are low concrete guardwalls. The guardwalls are 4'7" high, 14-feet long and 3'1½" wide. There are three sets of three bush hammered grooves on the fascia of the guardwalls. They are spaced 2'3" apart and are 3'6" in length. The grooves themselves are of the same dimensions as on the pilasters and sidewalls. On the inside of the guardwalls, there are three recessed panels. The panels are spaced 1-foot apart and are 3'6" wide and 1'5" in height. There are also recessed panels on the inside of the pilasters. They are 2'5" wide and 1'9" in height. All panels are ¼" deep. Originally, there was a 2'6" x 2' steel plate attached to a pilaster at each end of the bridge. The words "Missoula River" was stamped on raised letters on each plate. The plates were painted white with a black border and black lettering.

Spans Nos. 2 and 6 are composed of steel I-beam stringers and floor beams supported at bents Nos. 2 and 7 by cast steel expansion joints and to piers nos. 3 and 6 by fixed cast steel bearings. There are three sets of six I-beams, which are 9" wide, 18" deep and 13'10" in length. The six lines of steel stringers are spaced 6-feet apart and help support the reinforced concrete deck slabs. The stringers are riveted to the I-beam floor beams by angle plates. The stringer ends are recessed 2'5" into the backwalls, which support the cast steel fixed bearings. The floor beams are 10" wide, 2-feet deep and are beveled on the outside ends. The floor beams, in turn, rest on two 3-foot deep by 14-inch wide I-beams, the ends of which rests on Piers Nos. 3 and 5. The floor beams are riveted to the transverse beams by angle plates. The transverse beams are connected by two 8" x 8" struts. The approach spans are strengthened with two sets of crossed sway braces composed of angle sections. The sway brace frames are 20-feet in length and 24-feet wide and are separated by a transverse angle iron strut that is 24-feet in length. The sway

braces themselves are 18-feet in length and are riveted to the outside stringers by rectangular gusset plates.

Spans Nos. 3, 4 and 5 consist of riveted steel Warren trusses. Each of the three spans are 130-feet in length and 23-feet wide. The trusses are 13-feet deep between the top and bottom chords at the ends and 19-feet deep at the apex of the "arches." Each span is composed of 10 panels of 13-feet each – Montana bridge designers generally utilized even numbered panels on crossings of more than 220-feet in length.³⁵

The top chord is composed of riveted laced channel sections, while the bottom chord consists of riveted channel sections connected by batten plates riveted to the top and bottom flanges. The top chord is 18" deep and 1'1½" wide. The batten plates on the bottom chords are spaced every 3½ to 4½ feet. The diagonals consist of 12" x 12' steel I-beams except at the span joints where they are laced channel sections. The vertical posts consist of 12" x 11' steel I-beams. All the diagonals and vertical posts are riveted to the chords by steel gusset plates. There are lateral braces connected by gusset plates to the top and bottom chords; there are two braces per panel for a total number of 60 lateral braces on the Orange Street Bridge. The lateral braces are composed of crossed angle sections connected by batten plates riveted to the flanges. There are also one vertical sway brace per panel at each of the panel points. These braces are also riveted to the chords and floor beams by gusset plates. They are crossed with a single angle section connected vertically to the floor beams and an angle section that connects each of the panel points transversely. The vertical sway braces are 24-feet wide and 13-feet in height. The panel points are bolted to cast steel rocker bearings which, in turn, are embedded into the pier caps.

The deck of the Orange Street Bridge consists of seven reinforced concrete slabs that are 4'5" thick. The deck is flanked by two 5-wide concrete sidewalks raised about 16" above the deck. For spans nos. 2 through 6, the guardrails consist of steel grill-type handrails bolted to concrete posts. The posts are 3' x 10" x 1' and are spaced 5-feet apart; there are 73 posts on each side of the bridge. The tops of the posts are beveled to a pyramidal shape. The steel grill handrail units are 2'2" in height, 3¼" wide and 5'7" long.

Material

The Orange Street Bridge is composed of 420.15 tons of structural steel, 8 tons of cast steel, 88 tons of reinforcing steel, 1,877.2 cubic yards of concrete and 714 linear feet of metal rail. Approximately 2,410 cubic yards of earth was excavated to accommodate construction of the bridge.

Warren Trusses

Unlike most bridge trusses of the 19th century, the Warren truss was not developed in the United States. The truss was developed in Great Britain in 1848 by Captain James Warren and Theobald Willoughby Monzani from a design originated by a Belgian engineer named Neville in 1846. United States bridge engineer Squire Whipple also developed a "Warren" truss independently of the European designers in 1849. The truss is easily distinguishable from its contemporaries by the "W" configuration of the diagonal members. Like the Pratt truss, however, the Warren truss was frequently modified by engineers to accommodate traffic and site requirements. The first Warren truss constructed in the United States was built in Newark, New Jersey in 1851. The simplicity and economy of design of the truss should have made it appealing to the American railroad developers in the late 19th century. Instead, the railroad companies favored the more complicated and expensive Pratt and Howe trusses. By the early 1890s, a modification of the original Warren design began appearing more frequently on the nation's

railroad network. By 1925, the Warren truss became the standard steel bridge utilized by the railroads and state highway departments.³⁶

In Montana, the first known Warren through truss was constructed about 1895 by an, as yet, unknown contractor across the Big Hole River (24MA413) near Glen in Madison County. This rare pin-connected Warren truss is 90-feet long and is located on a road that once connected Dillon, a major railroad terminus and county seat of Beaverhead County, with the fertile Ruby River valley of southwestern Montana. By 1916, the Montana Highway Commission had developed a standard Warren through truss design that was readily adopted by the counties of the state. The first Warren truss, Browne's Bridge (24BE1534/24MA1210), built from the state's standardized designs is also located on the Big Hole River about six miles northwest of 24MA413. By 1928, the number of Warren trusses surpassed the number of pin-connected Pratt through trusses as the standard bridge on Montana's highways. Between 1916 and 1947, sixty-one Warren through, deck and pony truss bridge were constructed under the auspices of the Montana Highway Commission. The last Warren through truss built by the SHC in Montana was constructed in 1948 and crosses Crane Creek near the community of Crane in Richland County.

Deck Trusses

Unlike the through truss structures, the primary supports for deck truss bridges are located underneath the roadway. They are, therefore, more rigid by design and more costly in materials. Many are continuous span structures with relatively complex mechanisms to compensate for load weights and thermal expansion. The railroads initially developed deck trusses since offered no height limitations for locomotives and could accommodate greater weights. Because they are continuous, deck truss bridges are not divided into the separate spans as are the through trusses. The bridge, thus, functions as a unit. The load on one panel is systematically transmitted to the others, thereby distributing the load to the entire structure.³⁷

In 1897, the King Bridge Company constructed the first deck truss bridge in Montana. The bridge (24LC130) crosses the Dearborn River in Lewis and Clark County and provided access for the local farmers and ranchers to railroad stations in Augusta and Craig. This was the only highway deck truss bridge constructed in Montana until 1920 when Deer Lodge County built a deck truss over the Clark Fork River north of Warm Springs in 1920. The Clark Fork River bridge is apparently the first deck truss constructed in Montana from design provided by the Montana State Highway Commission.³⁸

The Montana State Highway Commission (SHC) designed and built hundreds of timber, steel stringer and girder, through truss and concrete bridges in the state between 1913 and 1947. However, they built few deck truss bridges. Evidence suggests that the design was reserved for special site conditions and locations where they would enhance the environment. The SHC built two deck truss bridges in the 1920s, six in the 1930s and four in the 1940s. During the 1920s, the standard deck truss was composed of riveted Pratt trusses. Constructed in 1930, the Gardiner Bridge (24PA790), at the north entrance to Yellowstone National Park, was the last riveted Pratt deck truss bridge constructed by the SHC.³⁹

In 1932, the Commission's bridge engineers designed a standard Warren deck truss structure. Between 1932 and 1942, the Commission constructed at least eleven deck truss bridges – nearly all located in northwestern and west central Montana. The stronger Warren truss allowed the construction of longer structures; the average length of a deck truss bridge was 655.5-feet as compared to 166-feet for Pratt through trusses. Five of the bridges cross the Clark Fork River in

Missoula and Mineral counties. Except for the Two Medicine Bridge in Glacier County, all were built by out-of-state contractors.⁴⁰

Because of the complexity of the design and site conditions, unskilled labor was unsuitable for these monoliths. Unlike the more simple through truss structures, deck truss bridges could not be as readily standardized, thereby initiating a revival of site specific bridge design in the SHC. The bridges built during this period (c. 1936 – 1942) were (and are) more aesthetically pleasing than the bridges constructed in the previous years. Among the first of these new structures, a bridge across the Middle Fork of the Flathead River near Essex, was constructed in 1937 and won an American Institute of Steel Construction award in 1938. The Orange Street Bridge's design was based on the Flathead River Bridge at Essex.⁴¹

Highway deck trusses are unique to the Montana landscape. Although relatively common to railroad bridges, they are rare for highways. From 1920 to 1952, the SHC designed and built only fourteen Warren deck truss bridges in Montana. Because of the great size, amount of material cost, the SHC generally reserved them for use on high and deep crossings where through trusses and the much narrower steel girder bridges were unsuitable. Of the fourteen deck trusses designed and built by the SHC, only nine still survive and constitute only 4% of the truss bridges constructed in Montana. Like the reinforced concrete arch bridges of the 1920s, deck truss bridges are significant reminders of the ambitious Montana State Highway Commission construction programs of the 1930s and early 1940s.⁴²

B. MODIFICATIONS

Other than the replacement of the original street lamps, there have been no modifications to this structure. It appears as it did when constructed in 1936-1937.

C. OWNERSHIP AND FUTURE

The Orange Street Bridge is currently owned and maintained by the Montana Department of Transportation. The department programmed the bridge for replacement in 1995 and a Memorandum of Agreement (MOA) was signed in December, 1996. The Orange Street Bridge will be demolished in 2001 or 2002.

IV. BIOGRAPHICAL MATERIAL

N/A

V. FOOTNOTES

1. Bernard DeVoto, *The Journals of Lewis and Clark* (Boston: Houghton Mifflin Company, 1953), 236, 415, 418-419, 452; Merrill G. Burlingame, *The Montana Frontier* (Helena: State Publishing Company, 1942), 6; Gary E. Moulton, editor. *The Journals of the Lewis & Clark Expedition*, volume 8 (Lincoln: University of Nebraska Press, 1993), 82-85.

2. Michael Malone, Richard Roeder and William Lang, *Montana: A History of Two Centuries*, rev. ed. (Seattle: University of Washington Press, 1991), 44; Burlingame, *The Montana Frontier*, 15; Jack Nisbet, *Sources of the River: Tracking David Thompson Across Western North America* (Seattle: Sasquatch Books, 1994), 234-235; Bernard DeVoto, *Across the Wide Missouri* (Boston: Houghton Mifflin Company, 1947), 11.

3. Malone, Roeder and Lang, *Montana*, 46; Burlingame, *The Montana Frontier*, 52-53; Dorothy O. Johansen and Charles M. Gates, *Empire of the Columbia: A History of the Pacific Northwest* (New York: Harper & Brothers, Publishers, 1957), 190-191, 266-267; Bernard DeVoto, *The Year of Decision: 1846* (Boston: Houghton Mifflin Company, 1943), 23, 230-231.

Burlingame, *The Montana Frontier*, 36, 263, 295-296; Malone Roeder and Lang, *Montana*, 62, 72; Ellen Bauml, "The Deportation of Major John Owen," (Helena) *Independent Record*, September 19, 1996.

5. Carroll Van West, *A Traveler's Guide to Montana History* (Helena: Montana Historical Society Press, 1986), 135; Burlingame, *Montana Frontier*, 34, 128-131; Albert J. Partoll, ed. "The Flathead Indian Treaty Council," *Pacific Northwest Quarterly*, XXIX, No. 3 (July, 1938), 283, 287-288; Kent D. Richards, *Isaac Stevens: Young Man in a Hurry*, (Pullman: Washington State University Press, 1993), 125, 226-230; W. Turrentine Jackson, *Wagon Roads West: A Study of Federal Road Surveys and Construction in the Trans-Mississippi West*, (Berkeley: University of California Press, 1952), 266, 271.

6. John Mullan, *Report on the Construction of a Military Road From Fort Walla-Walla to Fort Benton*. (Washington, DC: Government Printing Office, 1863), 38-39, 42; Granville Stuart, *Prospecting for Gold: From Dogtown to Virginia City, 1852 - 1864*. (Lincoln: University of Nebraska Press, 1977) 157-158; Betty Wetzel, *Missoula: The Town and the People*, (Helena: Montana Magazine, 1987), 14.

7. Stuart, *Prospecting for Gold*, 157, 165; Burlingame, *The Montana Frontier*, 93; Roberta Carkeek Cheney, *Names on the Face of Montana: The Story of Montana's Place Names*, (Missoula: Mountain Press Publishing Co., 1990), 187; Malone, Roeder and Lang, *Montana*, 94; Lenora Koebel, *Missoula The Way it Was*, (Missoula: Pictorial Histories Publishing Co., 1972), 17-27, 31; Poll Lists for the Election of October 24, 1864 (to establish Montana as a territory). Montana Historical Society, Helena.

8. Federal Writers Project, *The WPA Guide to 1930s Montana*, with a forward by William Kittredge (Tucson: University of Arizona Press, 1994), 173-175; Koebel, *Missoula*, 57; Lynn Fredlund and Kathy McKay, *Cultural Resource Inventory and Evaluation: Orange Street Bridge and Riverfront Access Project, Missoula, Montana*. Report prepared by GCM Services, Inc. for the Montana Department of Transportation, December 1994, 16; Louis Tuck Renz, *History of the Northern Pacific Railroad* (Fairfield Washington: Ye Galleon Press, 1980), 97, 162.

9. Koelbel, *Missoula*, 75, 90; Sanborn Fire Insurance Maps, 1884, 1888, 1890, 1891, 1902, 1912; Fredlund and McKay, "Orange Street Bridge", 16-19; Federal Writers' Project, *WPA Guide*, 173-174; Steve McCarter, *Guide to the Milwaukee Road in Montana* (Helena: Montana Historical Society Press, 1992), 68-69.

10. Federal Writers' Project, *WPA Guide*, 173; Montana Highway Commission Meeting Minutes, Volume 6 (November, 1933 - June, 1936), 288.

11. Montana Highway Commission Meeting Minutes, Volume 6, 310, 371-372; Contract. U.S. Works Program Highway Project No. WPMS 374-B, between the SHC and the Portland Bridge Company, May 8, 1937.

12. Montana Highway Commission Meeting Minutes, Volume 6, 436; Letter. William O. Whipps, SHC Secretary, to Bureau of Public Roads, March 25, 1936; Memorandum. Harold Tilzey, SHC Missoula District Engineer, to Helena Office, SHC, March 26, 1936; Memorandum. Tilzey to Helena Office, April 3, 1936; Tilzey to E. O. Parsons, SHC Right-of-Way Engineer, April 16, 1936.

13. Today, the former city dump has been reclaimed and has become a popular city park with up-scale condominiums and eating establishments bordering it. McCormick Park is also the site of summer concerts, plays and a restored early 20th century carousel. Montana State Highway Commission Meeting Minutes, volume 6, 458; Memorandum. Harold Tilzey, Division Engineer, to SHC, Helena, March 26, 1936; Memorandum. Tilzey to SHC, April 3, 1936.

14. Contract. U.S. Works Program Highway Project No. WPMS 374-B, between the SHC and the Portland Bridge Company, May 8, 1937; "Missoula Bridge Bids Open Today," *The Daily Missoulian*, May 8, 1936; Montana Highway Commission Meeting Minutes, volume 6, 483; "Copper Treated Steel Pilings in New Bridge Here," *The Daily Missoulian*, June 30, 1936.

15. "Work May Begin Soon on Bridge Contract Here," *The Daily Missoulian*, May 21, 1936; Letter. D. A. McKinnon, State Highway Engineer, to Bureau of Public Roads, June 18, 1936; Memorandum. Harold Tilzey, Division Engineer, to SHC, Helena, June 20, 1936; "Copper Treated Pilings on New Bridge Here," *The Daily Missoulian*, June 30, 1936; McKinnon to R. E. Meith, Portland Bridge Company, August 4, 1936.

16. "Fall From Bridge Results in Severe Injury," *The Daily Missoulian*, August 6, 1936; Letter. D. A. McKinnon, State Highway Engineer, to Portland Bndge Company, August 10, 1936; Letter. E. H. Blakeslee, Thomas Staunton Company, to Ralph D. Rader, SHC Bridge Engineer, August 13, 1936.

17. "Excavation Has Begun on First Pier For Bridge," *The Daily Missoulian*, August 20, 1936; Letter. H. C. Tilzey, Division Engineer, to R. E. Meith, Portland Bridge Company, August 22, 1936.

18. "Overpass Crews Commence Work on Center Spans," *The Daily Missoulian*, August 22, 1936; Memorandum. Richard E. Slaterry, Project Engineer, to Russell A. Stephenson, Bridge Construction Engineer, September 14, 1936; "Work Advances on New Bridge Project Here," *The Daily Missoulian*, September 17, 1936; "Overpass Project of Milwaukee Line Nears Completion, *Ibid*, September 117, 1936.

19. M. J. Steere, *History of the Montana Highway Department, 1913 - 1942*, (Helena: Montana State Highway Department, 1943), 32, 145 - 147; Montana Highway Commission Meeting Minutes, volume 6, 181 - 182.
20. Letter. R. E. Meith, Portland Bridge Company, to Guy Johnson, Division Engineer, June 8, 1937; Memorandum. Johnson to SHC, Helena, July 3, 1937; Montana State Highway Commission Meeting Minutes, volume 7, 34 - 35; Montana Highway Commission, *Ibid*, 194, 195; "Staunton Drops Assault Charge Against Group," *The Daily Missoulian*, September 25, 1936.
21. "Steel Erection Will Start Next Week on Bridge," *The Daily Missoulian*, December 8, 1936; Letter. H. C. Tilzey, Division Engineer, to R. E. Meith, Portland Bridge Company, December 21, 1936; Memorandum. Richard Slattery, Project Engineer, to Russell Stephenson, Bridge Construction Engineer, January 5, 1937; "Construction of Steel Parts is Begun on Bridge," *The Daily Missoulian*, February 4, 1937.
22. "Steel Erection for New Bridge Will Start Soon," *The Daily Missoulian*, January 6, 1937; "Construction of Steel Parts Begun on Bridge," *Ibid*, February 4, 1937; "Riveting Starts Monday on Bridge Steelwork Here," *Ibid*, February 19, 1937; "Steel Erection on Bridge Done, Riveting Next," *Ibid*, February 21, 1937.
23. Order for Additional Work No. 5 (Change in Plans). H. C. Tilzey, Division Engineer, to Richard Slattery, Project Engineer, March 1, 1937; "Bridge Building Goes Ahead Fast," *The Daily Missoulian*, March 6, 1937; "New Bridge Linking North and South Sides of City Being Pushed Toward Completion," *Ibid*, March 18, 1937; Order for Additional Work and Work by Agreement. Slattery to Portland Bridge Company, March 23, 1937.
24. "Concrete Work on New Bridge to Start Soon," *The Daily Missoulian*, May 12, 1937; Letter. Russell A. Stephenson, Bridge Construction Engineer, to R. E. Meith, Portland Bridge Company, May 20, 1937.
25. "Concrete Pouring is Moving Ahead," *The Daily Missoulian*, May 26, 1937; Letter. R. E. Meith, Portland Bridge Company, to Guy Johnson, Division Engineer, June 8, 1937.
26. "Completion of New Bridge Expected Soon," *The Daily Missoulian*, June 18, 1937; Letter. W. H. Lynch, Bureau of Public Roads District Engineer, to SHC, Helena, June 22, 1937; Letter. B. Weinstein, Portland Bridge Company, to R. E. Meith, Portland Bridge Company, June 24, 1937.
27. "New City Dump Will be Ready First of Week," *The Daily Missoulian*, June 25, 1937; Guy Johnson, Division Engineer, to Richard E. Slattery, Project Engineer, June 28, 1937; Certification of Completion of Construction Contract. Johnson to SHC, Helena, July 1, 1937; Memorandum. Johnson to Slattery, July 2, 1937; Letter. Russell A. Stephenson, Bridge Construction Engineer, to Bureau of Public Roads, July 3, 1937; "First Traffic Rolls Over New Missoula Bridge," *The Daily Missoulian*, July 3, 1937; "Span's Special to Its Builder," *The Missoulian*, undated 1987.

28. "New Bridge Will Be Dedicated By Local Activians," *The Daily Missoulian*, July 2, 1937; "Dedication of New Bridge to Include Award," *The Daily Missoulian*, July 9, 1937; "Bridge Naming Contest to Close Tonight," *The Daily Missoulian*, July 12, 1937.
29. No barrier has ever been installed on the bridge to prevent pedestrians from falling down the fill slope. "Something Overlooked" [editorial], *The Daily Missoulian*, July 7, 1937; "No Lights Yet For New Bridge, Cables Melted," *The Daily Missoulian*, July 16, 1937.
30. Memorandum. Guy Johnson, Division Engineer, to SHC, Helena, July 9, 1937; "No Lights Yet For New Bridge, Cables Melted," *The Daily Missoulian*, July 16, 1937.
31. Letter. B. J. Ornburn, Chief Bridge Design Engineer, to Lloyd Hague, State Highway Commissioner, July 12, 1937; "No Lights Yet For New Bridge, Cables Melted," *The Daily Missoulian*, July 16, 1937; "Outlook Bleak on New Bridge, No Lights Yet," *Ibid*, July 29, 1937; Transformer is Due for Lights on New Bridge," *Ibid*, October 5, 1937.
32. "City is Prepared to Receive 200 Visitors Today," *The Daily Missoulian*, July 16, 1937; "Span Formally Dedicated, Called Parkway Bridge," *The Daily Missoulian*, July 17, 1937; "Dedication of New Bridge to Include Award," *The Daily Missoulian*, July 9, 1937.
33. Certification of Completion of Construction Contract. Guy Johnson, Division Engineer, to SHC, Helena, July 1, 1937; Memorandum. Johnson to SHC, July 3, 1937; State Highway Commission Meeting Minutes, Volume 7 (July 30, 1937), 194, 195.
34. The city park now encompasses the abandoned Milwaukee Road Railroad grade and is located just to the west of the railroad's old depot. The overpass is now used primarily by pedestrians and bicyclists utilizing the old railroad grade as a recreational trail. Montana Highway Commission Meeting Minutes, volume 7 (July 31, 1936 - May 12, 1939), 221-222; *Ibid*, Volume 16 (1962 - 1963), 6-7.
35. George R. Metlen, Report of the Montana State Highway Commission for the Years 1915 - 1916, (Helena: The Independent Publishing Company, 1916), 5 - 6.
36. Jon Axline, *Monuments Above The Water: Montana's Historic Highway Bridges, 1860 - 1956*, (Helena: Montana Department of Transportation, 1993), 34-35.
37. Axline, *Ibid*, 36; Carl Condit, *American Building: Materials and Techniques From the Beginning of the Colonial Settlements to the Present*, (Chicago: The University of Chicago Press, 1982), 215-216.
38. Jon Axline, "Few Bridges Draw Attention Like One Spanning Dearborn," (Helena) *Independent Record*, May 19, 1994.
39. Axline, *Monuments Above the Water*, 37.
40. Axline, *Ibid*, 38.
41. The Essex Bridge was destroyed by a flood in 1964. Axline, *Monuments Above the Water*, 39; Interview with John Morrison by John Terreo, 1988. Oral History No. 1136, Montana Historical Society, Helena.

42. Axline, *Monuments Above the Water*, 39.

VI. BIBLIOGRAPHY

A. BOOKS

Axline, Jon. *Monuments Above the Water: Montana's Historic Highway Bridges, 1860 - 1956*. (Helena: Montana Department of Transportation, 1993).

Baumler, Ellen. "The Deportation of Major John Owen." in *More From the Quarries of Last Chance Gulch*. Volume 3 (Helena: Helena Independent Record, 1998).

Burlingame, Merrill G. *The Montana Frontier*. (Helena: The State Publishing Company, 1942).

Cheney, Roberta Carkeek. *Names on the Face of Montana: The Story of Montana's Place Names*. (Missoula: Mountain Press Publishing Company, 1990).

Cohen, Stan. *Missoula County Images*. (Missoula: Pictorial Histories Publishing Company, 1982).

Condit, Carl W. *American Building: Materials and Techniques From the Beginning of the Colonial Settlements to the Present*. Second Edition. (Chicago: The University of Chicago Press, 1982).

DeVoto, Bernard. *The Year of Decision: 1846* (Boston: Houghton Mifflin Company, 1943).

_____. *Across the Wide Missouri*. (Boston: Houghton Mifflin Company, 1947).

_____, ed. *The Journals of Lewis and Clark*. (Boston: Houghton Mifflin Company, 1953).

Johansen, Dorothy O. and Charles M. Gates, *Empire of the Columbia: A History of the Pacific Northwest* (New York: Harper & Brothers, Publishers, 1957).

Koelbel, Lenora. *Missoula the Way It Was*. (Missoula: Pictorial Histories Publishing Company, 1972).

McCarter, Steve. *Guide to the Milwaukee Road in Montana*. (Helena: Montana Historical Society Press, 1992).

Malone, Michael P., Richard B. Roeder and William L. Lang. *Montana: A History of Two Centuries*. Rev. ed. (Seattle: University of Washington Press, 1991).

Merriman, Mansfield and Henry S. Jacoby. *A Text-Book on Roofs and Bridges*. Four volumes. (New York: John Wiley & Sons, 1910).

Metlen, George R. *Report of the Montana State Highway Commission for the Years 1915-1916*. (Helena: Independent Publishing Company, 1916).

- Moulton, Gary E., editor. *The Journals of the Lewis & Clark Expedition*. Eleven volumes (Lincoln: University of Nebraska Press, 1993).
- Newspaper Editors of Montana, comp. *Men of Affairs and Representative Institutions of the State of Montana, 1914*. (Butte: Butte Newswriters' Association, 1914).
- Nisbet, Jack. *Sources of the River: Tracking David Thompson Across Western North America* (Seattle: Sasquatch Books, 1994).
- Quivik, Frederic L. *Historic Bridges of Montana*. (Washington, DC: National Park Service, 1982).
- Raymer, Robert George. *Montana: The Land and the People*. Three volumes. (Chicago: The Lewis Publishing Company, 1930).
- Report of State Highway Commission of Montana for Biennium Ending December, 1930*. (Helena: State Highway Commission, 1931).
- Robertson, Donald B. *Encyclopedia of Western Railroad History*. Two volumes. (Dallas: Taylor Publishing Company, 1991).
- Steere, M. J. *The History of the Montana Highway Department, 1913 - 1942*. (Helena: Montana State Highway Department, 1943).
- Stout, Tom. *Montana: Its Story and Biography*. Three volumes. (Chicago: The American Historical Society, 1921).
- Stuart, Granville. *Prospecting for Gold: From Dogtown to Virginia City, 1852 - 1864*. (Lincoln: University of Nebraska Press, 1977).
- Toole, John H. *Red Ribbons: A Story of Missoula and Its Newspaper*. (Helena: Falcon Press, 1989).
- Van West, Carroll. *A Traveler's Companion to Montana History*. (Helena: Montana Historical Society Press, 1986).
- Waddell, J. A. L. *Bridge Engineering*. Two volumes (New York: John Wiley & Sons, Inc., 1916).
- Watkins, T. H. *The Great Depression: America in the 1930s*. (Boston: Little, Brown and Company, 1993).
- Wetzel, Betty. *Missoula: The Town and the People*. (Helena: Montana Magazine, 1987).
- Willard, John. *Adventure Trails in Montana*. (Boulder, Colorado: Pruett Publishing Company, 1986).

B. PERIODICALS

The Centerline. Montana Highway Department newsletter. Volumes 1 - 2 (1938 - 1939).

Comp, T. Allan and Donald Jackson. "Bridge Truss Types: A Guide to Dating and Identifying." American Association For State and Local History Technical Leaflet. (May, 1977).

Eckel, C. L. "The Development of Simple Truss Types of Bridge Structures in the United States." *Colorado Engineer* 25 (November, 1928).

C. NEWSPAPERS

The *Daily Missoulian*, June 1, 1936 - December 31, 1937.

D. MISCELLANEOUS

Bridge Construction File No. WPMS 374-B. Montana Department of Transportation, Helena.

Fredlund, Lynn and Kathy McKay. Cultural Resource Inventory and Evaluation: Orange Street Bridge and Riverfront Access Project, Missoula, Montana. Report prepared by GCM Services, Inc. for the Montana Department of Transportation, December 1994.

John Morrison Interview. Oral History 1136 (November, 1988). Montana Historical Society, Helena.

Montana Highway Commission Meeting Minutes, Volume 6 (November, 1933 - June, 1936). Montana Department of Transportation, Helena.

Montana Highway Commission Meeting Minutes, Volume 7 (July 31, 1936 - May 12, 1939). Montana Department of Transportation, Helena.

Montana Highway Commission Meeting Minutes, Volume 16 (1962 - 1963). Montana Department of Transportation, Helena.